$$\sqrt{\tan(x)} = (\tan(x))^{1/2}$$

Por regla de la cadena con $u = \tan(x)$

$$\frac{d(\tan(x))^{1/2}}{dx} = \frac{du^{1/2}}{du} \cdot \frac{d\tan x}{dx}$$

$$\frac{du^{1/2}}{du} = u^{-1/2} = \frac{1}{2\sqrt{\tan x}^{1}}$$

$$\frac{d\tan x}{dx} = \sec^2 x = \frac{1}{(\cos^2(x))^{1}} = \frac{2}{\cos(2x)+1}$$

Por lo tanto:

$$\frac{d\sqrt{\tan x}}{dx} = \frac{1}{(\cos(2x)+1)\sqrt{\tan x}^{1}}$$